



OPERATION AND MAINTENANCE MANUAL



DAY TANKS AND DAY TANK SYSTEMS



ENGINE & COMPRESSOR ACCESSORIES

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INSPECTION

Upon receipt of the E&CA day tank, inspect the package for any signs of damage before signing the bill of lading. If there is any visible damage, immediately notify the shipping company. Remove the top cover and inspect for possible damage that might have occurred during shipment. All products are inspected at the point of shipment to ensure they are free from any defects and are in good working condition. Dropping and other rough handling in transit could place stress or break welds and plumbing joints that will result in failure. Electrical components or hardware may become loose during shipping. Check to ensure that the tank arrives in good condition.

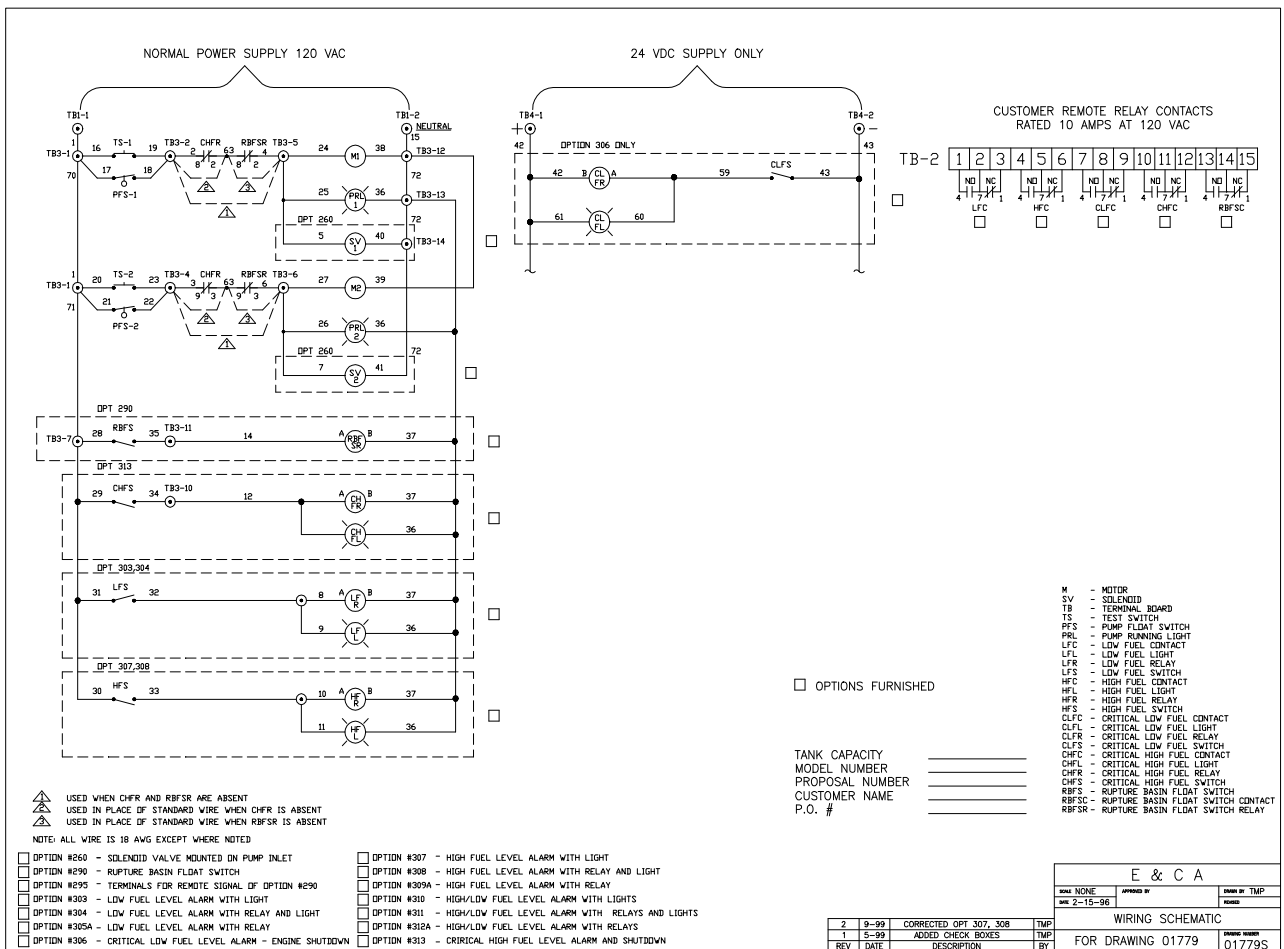
FACTORY TESTING

During fabrication, E&CA tanks are tested at 3 psi per UL-142 and checked a second time by quality control personnel. All E&CA tanks are carefully tested for proper operation. Power is applied to the unit and all aspects of the tank operation are tested. Alarms are tested by manually changing control levels in the sequences of operation. Components with contacts are tested for continuity during "closed" conditions. Float levels for pump motor controls are tested for start up and shut down of the motor. Proper rotation of the pump and motor are checked while in operation. All reset and test switches are checked for proper operation.

MECHANICAL INSTALLATION

The tank should be placed so that the various fuel and vent connections can be easily connected and inspected. 1" NPT pipe connections are located on the sides and rear of the day tank. Remove the shipping plugs from all connection fittings. A minimum of 6" to 8" from any wall is required for installation. Mounting holes are provided in the base of all E&CA day tanks. The tank should be bolted down before any piping is installed. This should eliminate any piping stresses due to misalignment.

Always have the fuel system installed by trained, authorized personnel. E&CA tanks are designed for open venting (not pressurized fuel systems). Make sure the vents are properly installed and unobstructed. The tank must be able to "breathe" to ensure normal operation. All fuel piping should be of black iron pipe. Brass, copper, or galvanized pipe can cause decomposition of fuel over extended periods of time. Pipe sizes should follow engine manufacturer's recommendations based on engine ratings plus distance and elevation between the main tank and engine. The overflow line should be equal to larger than the supply line. This line takes any overflow of the day tank and returns it to the main tank. The vent line should be piped vertically from the day tank above the highest point in the fuel system. Connect the engine supply line per the manufacturer's recommendations. Flex hose requirement, pipe size, suction limitations and final connection should be specified. The fuel inlet to the day tank is located at the fuel transfer pump. This will be a 1" NPT to 1" NPT connection depending on the pump(s) specified. Piping clearances are provided in the removable top cover. The engine fuel return line should be connected per the manufacturer's recommendations. Depending on engine requirements, fuel may be returned to the day tank at the same level and pressure of the fuel supply line, or to a point located above the normal day tank fuel level. E&CA provides both connections on all day tanks.



ELECTRICAL INSTALLATION

Always have the electrical system installed by trained, authorized personnel. E&CA day tanks are provided with terminal points for all customer connections. These points are located on easily accessible terminal strips under the removable top cover. Power requirements and customer connections depend upon the number and types of options included on the day tanks. Please refer to the job specific E&CA wiring schematic (typical dual pump schematic shown above) and the component wiring diagram included with the day tank.

PUMPS AND MOTORS

GENERAL INFORMATION

PUMPS

The standard pump is a 2 GPM Bronze Gear Pump. Other pump models include: 4, 7, 10, and 20 GPM.

The pump is directly driven from the shaft of the electric motor by means of a flexible coupling. On the 2, 4 and 7 GPM pumps, an aluminum adapter connects the pump to the motor.

GENERAL DESCRIPTION

Pump housings and gears are made of top quality bronze, shafts are 303 stainless steel. Bearings are designed of high performance carbon-graphite material selected for wear resistance and long service life. Gear pumps are positive displacement pumps. Each shaft revolution displaces a definite amount of liquid relatively unaffected by the back pressure in the discharge line. Shaft speed and flow are directly proportional. Recommended pressure limits are 100 PSI for water and non-lubricants, 150 PSI for oil and other lubricants. The maximum shaft speed is 1750 RPM.

SHAFT SEALS

Close coupled gear pumps are supplied with a Buna N lip seal.

LIQUIDS AND TEMPERATURE

These pumps are suitable for all liquids that are compatible with bronze. Liquids containing solids, abrasives, powders, or paint pigments are definitely not recommended for gear pumps. A **fuel strainer** (E&CA option #215, 216 or 217) should be installed just ahead of the pump (and solenoid valves, check valves, and other like devices) to keep debris from entering the system. The recommended liquid temperature range is from 32° F to 140° F for best pump life. If more extreme temperature conditions exist, factory should be consulted. Freezing of pumps can cause damage and must be avoided. Oils at low temperatures are very viscous requiring a lower speed or extra power.

SUCTION LIFT

As a general rule, the suction lift should be kept at an absolute minimum by placing the pump as close to the liquid source as possible. A gear pump in new condition can lift 20 feet of water in the suction line. A **check valve** (E&CA option #255) is recommended at the beginning of the suction line. For a first start-up, the pump should be primed using a **priming tee** (E&CA option #282) to wet the pump gears to avoid dry running. Minimum size of the suction pipe is the size of the pump inlet port. For longer suction lines (over 3 feet) or for viscous liquids, the pipe should be at least one size or two sizes larger than the pump inlet port.

ROTATION AND RELIEF VALVE

If the discharge line contains any throttling devices such as a shut-off valve, a spray nozzle or other restrictive device, it is necessary to have a relief valve in the system which returns the liquid to the suction side or to the tank. The relief valve is also available as part of the pump itself (R-model pumps). However, built-in relief valves are only good for intermittent service. If used continuously, the pump will over-heat. A built-in relief valve is strictly a safety device against over pressure. It will not work successfully as a pressure or flow control device. For this purpose a separate relief valve in the pressure line must be used. Unless otherwise specified, the pump motor unit is supplied by the factory for shaft rotation counterclockwise from shaft end. Reversing motor will reverse "in and "out" ports and also requires changing relief valve location. The relief valve is always on the inlet side of this pump series. The factory pressure setting is 50 PSIG. To increase pressure, turn the relief valve adjusting screw in a clockwise direction.

MOTORS

The standard motor coupled to the 2 GPM pump has these characteristics: 1/3 HP, 115 VAC, 1 PH, 60 Hz, Thermal Protected, 6.6 FL Amps, 1.0 Service Factor. The standard motor is special split phase with moderately high starting torque as well as a moderately high starting current. The thermal protected motors have internal, automatic protections that will reset after the motor cools. Other motor configurations are available range from 1/4 HP VDC motors up to 1 HP, 460 VAC, 3 PH.

Install power to the motor(s) according to National Electrical Code.

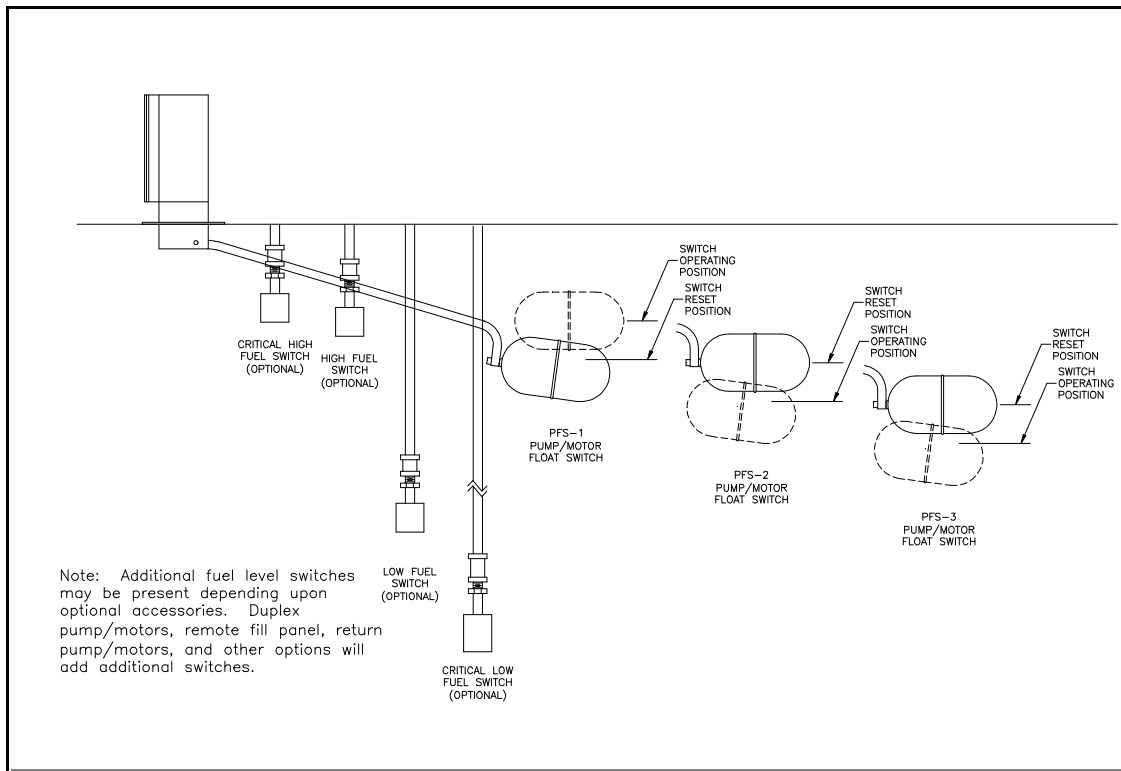
Motor Lubrication

Sleeve Bearings - re-oil using 35W-20 oil every 3000 hours of motor operation.

Ball Bearings - if the motor has provision for re-greasing, use a good grade of bearing grease every 2000 hours

If lubrication instructions appear on the motor, they will supercede these instructions.

Do not use unauthorized repair parts. These can affect proper and safe operation of the motor. Contact Engine and Compressor Accessories for replacement parts.



SEQUENCE OF OPERATION

When power is applied to the tank the pump/motor will begin to fill the tank.

1. As the fuel rises the **Duplex Pump** (E&CA option #127) PFS-3 float switch opens and stops the secondary pump/motor. As the fuel rises to the 100% level, the PFS-2 (standard on all Day Tanks) float switch opens and stops the primary pump/motor.
2. As the generator consumes fuel and the level drops 1½ inches, PFS-2 closes and starts the primary pump/motor which will fill the tank until the 100% fuel level is reached.
3. If the fuel drops 3 inches, PFS-3 closes and starts the secondary pump/motor which will assist the primary pump/motor to fill the tank.
4. If the fuel level drops below the lowest normal pump/motor “on” position, the **Low Fuel Level Alarm** (E&CA option #304) closes allowing a light on the control panel to illuminate and a set of dry contacts for remote annunciation to become active.
5. If the fuel level continues to drop to a critical level (about 1" of usable fuel remaining in tank) the **Critical Low Fuel Level Alarm** (E&CA option #306) closes allowing a light on the control panel to illuminate and a set of dry contacts for remote annunciation to become active. This is a complete and separate circuit, normally powered from the generator battery. This is intended to be used as a “shut-down” signal to the generator before air is pulled into the injectors.
6. If the fuel rises above the primary pump/motor “off” position the **Return Pump** (E&CA option #170) float switch, PFS-1, will close and start a reverse acting pump/motor which will pump the fuel down until the 100% fuel level is reached.
7. If the fuel level continues to rise above the **Return Pump** pump/motor “on” position, the **High Fuel Level Alarm** (E&CA option #308) closes allowing a light on the control panel to illuminate and a set of dry contacts for remote annunciation to become active.
8. If the fuel level continues to rise to a critical level (just before reaching an overflow condition) the **Critical High Fuel Level Alarm** (E&CA option #313) closes allowing the following:
 - a. A light on the control panel to illuminate
 - b. A set of dry contacts for remote annunciation to become active.
 - c. The main control circuit to the pump/motor(s) and N.C. solenoid valve(s) (included in option) is interrupted.
 - d. Return Pump control circuit continues to operate.
9. If fluid enters the rupture basin (E&CA option #285) the **Rupture Basin Float Switch** (E&CA option #290) closes allowing the following:
 - a. A set of dry contacts (option 295) for remote annunciation to become active.
 - b. The main control circuit to the pump/motor and N.C. solenoid valve (E&CA option #260) is interrupted.

SALES TERMS

E & C A

STANDARD CONDITIONS OF SALE

All orders are subject to acceptance by Engine and Compressor Accessories. Any acceptance by E&CA of Buyer's order is expressly conditional on Buyer's assent to any additional or different terms and conditions contained herein, and all sales and charges of the products listed herein shall be, in the case of conflict between the terms and conditions of E&CA and Buyer, interpreted and governed exclusively by the terms and conditions contained herein. E&CA shall not be bound by any terms and conditions proposed by Buyer, whether in its purchase order or otherwise, which are additional to or different from the terms and conditions set forth herein, unless and only if accepted in writing by a principal officer of E&CA or his designated representative.

PRICE POLICY

Price in effect at time of order entry, provided order is fully released for immediate shipment. Special or obsolete renewal parts will be subject to price in effect at time of shipment. List prices and discounts as published in this catalog will apply to all order. Special products or obsolete parts will be quoted on a refer to office basis. Whenever possible, E&CA will provide a minimum of 30 days advanced notice prior to the effective date of a price increase

E&CA's prices do not include any applicable federal, state, or local sales, use, excise or similar taxes; and the amount of any such tax which the Seller may be required to pay collect will be added to each invoice unless the Buyer has furnished E&CA with a valid tax exemption certificate acceptable to the taxing authorities.

TERMS OF PAYMENT

All payments will be due net 30 days after invoice date.

DELIVERY

Deliver dates indicated in the contract documents are approximate and are based on prompt receipt of all necessary information regarding the equipment covered by the contract. E&CA will use reasonable efforts to meet the indicated deliver dates, but cannot be held responsible for its failure to do so. Title to equipment and risk of loss or damage shall pas to Buyer upon deliver to a carrier. In no event shall E&CA be liable for any loss (including consequential) or damage occasioned by loss or non-receipt of the product.

FREIGHT POLICY

All shipments will be F.O.B. our warehouse. E&CA will select the least expensive method of transportation, the carrier and the routing; should the Buyer require an alternate method of shipment, the additional cost of such a shipment will be charged to the Buyer.

WARRANTY

Engine & Compressor Accessories warrants its products against defects in material or workmanship under normal use and service for a period of 12 months from the date of shipment from its plant in Houston, Texas.

E&CA's liability shall be limited exclusively to repairing or replacing any product found by E&CA to be defective, or at E&CA's option, to refund the purchase price of its product. Such product shall be returned, freight prepaid, to E&CA's factory. It is agreed that such replacement, repair or refund be the sole and exclusive remedies available from E&CA. E&CA shall not be liable for damages of any sort whatsoever beyond these exclusive remedies, including incidental and consequential damages, regardless of whether any claim is based on contract, negligence, strict liability, tort, warranty or any other basis. The repair or replacement of the product, or the refund of the purchase price, at E&CA's option, constitutes fulfillment of all liabilities of E&CA to the Buyer for defective products.

WARRANTY (continued)

Parts and accessories manufactured by outside suppliers shall be limited by that manufacturer's warranty.

If field service, at the request of the Buyer, is rendered and the fault is found not to be with the E&CA product, the Buyer shall pay the time and expense to the E&CA Field Representative. Bills for service, labor, or other expenses that have been incurred by the Buyer, their customer or agent, without approval or authorization by E&CA will not be accepted.

Limitations on Claims and Actions

Any claim by the Buyer of a breach of the foregoing limited warranty shall be waived by the Buyer unless notice of any claimed breach is submitted to E&CA in writing within 30 days from the date the Buyer discovered, or reasonably knew of the alleged breach, but in no event more than one year from the invoice date. E&CA shall have an additional 30 days from receipt of such notice to respond to the notice.

This warranty does not cover failure resulting from improper installation or use.

Changes or repairs made in the field without authorization from E&CA will void this warranty.

Nuclear Indemnification

E&CA does not market products for nuclear installation, and it is the responsibility of the Buyer to notify E&CA if it intends to utilize an E&CA product in nuclear installation and to specify if the product is to be used in a safety related function, so the sale may be declined.

Force Majeure

E&CA shall not be liable for any delay in delivery or for non delivery, caused, in whole or in part, by the occurrence of any contingency beyond the control of either E&CA or E&CA's suppliers, including but limited to, war (whether an actual declaration thereof is made or not); sabotage; insurrection; riot or other act of civil disobedience; act of a public enemy; failure or delay in transportation; act of any government or any agency or subdivision thereof; judicial action; labor dispute; accident, fire, explosion, labor, fuel, raw material or machinery; freight embargo; confiscation by governmental authority; breakage in transit; and unavailability of manufacturing facilities due to any of the foregoing. In the event of any such delay, the date of delivery shall be extended by the period of the delay. E&CA expressly reserves the right to allocate production and deliveries among its customers.

CANCELLATIONS

A handling fee of \$60.00 will be made for model number finished goods and high usage renewal parts if order has been received, but not shipped by E&CA. On non-standard products scheduled but not yet released for production, the customer will be charged for our cost to date, associated with the production of the order. If non-standard product is ready to ship or is in E&CA inventory, 100% of the purchase price will be charged.

RETURNS

The following terms and conditions will apply for all returned goods of E&CA products:

1. All unused E&CA products returned under this Return Goods Policy shall be in first class, salable condition, in original packaging and subject to E&CA inspection. Used or damaged E&CA products will not be accepted for credit unless authorized by E&CA. A restocking charge of 20% will apply.
2. All requests for the return of E&CA products shall be directed to the attention of your normal field or customer service representative.
3. All return must be authorized. A completed Return Goods Authorization form must be obtained from your customer services representative and a copy of the RGA included with the packing list. In the event a shipment is received without authorization, the material will be refused and the carrier instructed to return the shipment to the point of origin.
4. All returned E&CA products must be shipped either freight prepaid or collect. This will be indicated on the Return Goods Authorization.
5. A Return Goods Authorization will be valid for 60 days from the date of issue. Please make your shipment as soon as you have received authorization.